

09-14-05

• Notes on Physical & Chemical Properties

• Physical properties of matter → prop.^s that can be observed w/o changing the chemical makeup

ex. color, shape, melting pt (MP), boiling pt (BP), odor, texture, mass, volume. [2 distinct groups]

• (color), shape, texture, mass, volume → extensive physical props.

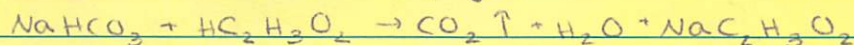
• MP, BP, odor → intensive physical props

→ extensive phys. prop.^s → depends on amount; is changeable.

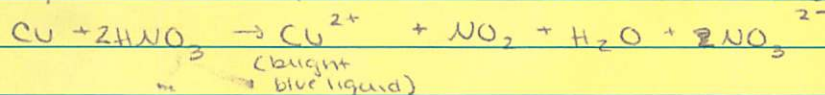
→ intensive phys. prop.^s → doesn't depend on amount [another ex.^s → density, malleability (ability to be bent)]

• Chemical Properties - property observed while change chemical makeup

ex. "middle school volcano project"



→ best example → Ira's experiment → nitric acid acts on copper.



• 4 lines of evidence for a chemical reaction

1) gas produced (bubbles) → most gases produced is clear.

2) precipitate (ppt) → a solid formed in a chemical reaction

3) Energy change → could be... heat (& released) or & being absorbed (chemical ice packs)
or light & being released (like a glow stick) or sound & being released.

→ exothermic - heat is released

→ endothermic - heat is absorbed.

4) color change [NOT conclusive to a chemical reaction]

09-15-05

• Classification of matter → either mixtures or pure substances.

Mixture - combination of two or more substances in which they retain their individual properties & can be physically separated.

→ ways to physically separate a mixture → evaporation, filter, decant (taking some liquid w/ a solid & carefully pouring off liquid, leaving the solid),

centrifugation (separating solids & liquids w/ fast motion)

• 2 classes of mixtures → homogeneous & heterogeneous

→ homogeneous - a uniform mixture (ex. copper ions in water)

→ heterogeneous - "not uniform" mixture (ex. sand in water)

• 3 Groups/types of mixtures

1) Suspension - largest particle size → which settle out. (ex. shake a beaker of water & sand → sand will settle to the bottom) → heterogeneous

2) Colloid - intermediate particles → don't settle. (ex. mayo, ^{or} milk) → homogeneous

3) Solution - smallest particle size → don't settle. → homogeneous.

• Tyndall Effect (to tell the difference between a colloid & a solution)

↳ just shine a light through the mixture.

→ I can see the beam = colloid [can see the light b/c light is able to reflect off particles]

(PS)

→ no beam → a solution [too small to reflect light].

• Pure substances - a substance with the same composition & properties no matter the source.

1. All samples of a PS must have the same characteristics.

2. All samples of a PS must have the same composition. (no matter the source).

Known as the Law of Definite Composition

ex. $C_{12}H_{22}O_{11}$ → 42.1% C, 51.4% O, 6.5% H. [based on mass]

3. If one breaks down a PS, it loses its individual properties.

(ex. sugar + sulfuric acid)

09-19-05

• Two Categories of PS⁵ → compound vs elements.

• element - a sample of matter that cannot be broken down by ordinary means.

• compound - a combination of 2 or more elements that can be broken down by ordinary means.

• Types of Elements (4 types) → metals, nonmetals, metalloids & noble gases.

→ metal - conductors, malleable [galvanable], ductile [can be drawn into wire], luster [shiny], high tensile strength [resistance to being pulled]

→ non-metals (opposite of metals) - insulators, brittle, dull
→ ex. Si


→ metalloids - semi-conductors [have properties of both metals & nonmetals]

→ noble gases (inert / unreactive gases)


• all can be found by looking at the Periodic Table of Elements.

- columns → called groups or families - have similar properties & reactivities.

- rows → called periods.

- every left of  → metals

right of  → nonmetals

on line  → metalloids (mostly)

group 18 → all noble gases.